PULP & PAPER

December 1990

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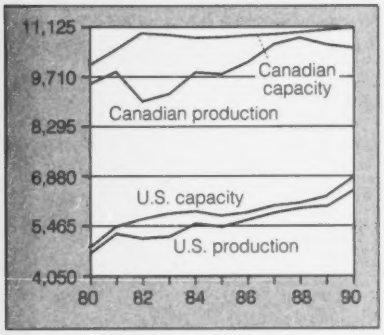
ABP

BPA

U.S. paper and board production



U.S. production of paper and paperboard totaled 6.5 million tons in September, up 2.1% from a year earlier, according to the American Paper Institute. The seasonally adjusted rate of production stood at 39.4 million tpy for paper and 38.8 million tpy for paperboard. Through the first nine months, the production rate climbed to 78.3 million tpy, up 2.2% from last year. Production has been consistently higher than year-earlier levels since the beginning of the year.

Among major grades, newsprint continued to show impressive gains due to the startup of four new machines since mid-1989, rising 8.8% through the third quarter. Printing and writing shipments posted a 3.5% increase over last year, on the strength of a 4.9% rise in coated paper shipments and a 3.9% increase for uncoated free-sheet.

Canadian newsprint shipments totaled 698,000 metric tons in September, down 15.9% from the same month last year, according to the Canadian Pulp & Paper Assn. Operating rates plunged from 94% last year to just 77% in September 1990. Woodpulp shipments were off 13.1% to 604,000 tons, with operating rates falling to 72%, down from 87% in September 1989. ■

	Latest month	(000 short tons)	% change from year ago	Annualized year-to-date (000 short tons)	% change from year ago
PAPER & PAPERBOARD PRODUCTION[1]					
Newsprint	Sept.	549	6.2	6,548	8.8
Uncoated groundwood (s)	Sept.	137	-9.9	1,734	-0.2
Coated paper (s)	Sept.	630	3.1	7,493	5.4
Uncoated free-sheet (s)	Sept.	928	4.9	11,507	3.9
Other printing/writing	Sept.	131	5.6	1,579	3.3
Total packaging and other paper (s)	Sept.	393	-3.2	4,694	-3.6
Tissue	Sept.	487	3.0	5,779	2.9
Total paper	**Sept.**	**3,254**	**2.7**	**39,334**	**3.3**
Unbleached kraft paperboard	Sept.	1,707	7.0	20,126	2.5
Semichemical medium	Sept.	455	-1.3	5,679	-0.3
Bleached paperboard	Sept.	376	7.1	4,457	-1.4
Recycled paperboard	Sept.	738	4.2	8,776	-0.3
Total paperboard	**Sept.**	**3,276**	**5.1**	**39,038**	**1.0**
Total U.S. paper and paperboard output	**Sept.**	**6,530**	**3.9**	**78,372**	**2.1**
PULP, WASTEPAPER & FIBER[2]					
Total U.S. woodpulp production	Aug.	5,343	0.8	63,185	1.2
Market pulp production	Aug.	808	6.7	8,904	0.1
Wastepaper consumption at paper/board mills	Aug.	1,856	7.5	21,202	6.3
Pulpwood consumption (cords)	Aug.	8,333	-1.9	99,326	0.6
CONVERTED PRODUCTS STATISTICS[3]					
Corrugated box shipments (billion ft²)	Sept.	25.375	-0.3	238.607[6]	1.2
Containerboard inventories at U.S. box plants and mills	Sept. 1	2,620	-1.7		
INTERNATIONAL TRADE[2]					
U.S. paper imports (including products)	Aug.	1,089	-10.0	13,218	2.8
Imports of Canadian newsprint	Aug.	671	-12.5	8,400[6]	1.2
U.S. paper exports (including products)	Aug.	603	7.7	6,842	8.7
Exports of unbleached kraft linerboard	Aug.	230	14.4	2,686	20.1
Exports of woodpulp	Aug.	554	3.7	5,961	-6.5
Norscan pulp inventories[4]	Sept. 30	1,494	50.3		
Norscan pulp operating rates[4]	Sept.	78%	84%	92%	87%
CANADIAN STATISTICS[5] *(reported in metric tons)*					
Total newsprint shipments	Sept.	698	-15.9	6,937[6]	-2.6
Operating rates	Sept.	77%	94%	92%	96%
Inventories held by U.S. consumers	Sept. 30	1,355	2.3		
Other paper/board shipments	Sept.	574	-1.0	5,550	7.3
Woodpulp shipments (export only)	Sept.	604	-13.1	5,631	-10.3
Operating rates	Sept.	72%	87%	84%	94%

1. American Paper Institute. 2. API, Bureau of Census, American Pulpwood Assn. 3. Fibre Box Assn., Paperboard Packaging Council. 4. North American/Scandinavian paper-grade market pulp. 5. Canadian Pulp & Paper Assn. 6. Not annualized. (s) = Shipments.

Newsprint: Prices improve despite more capacity, but five new machines next year may be too much

Grade structure: Newsprint is commonly sold in the U.S. in 28-lb to 32-lb. Although the industry has slowly been drawn to the lighter basis weights, this movement has been somewhat stalled by increased emphasis on printing quality and a slow acceptance of flexographic printing. Standard newsprint is still considered to be 30-lb, with brightness in the 55 to 61 range. Of total newsprint consumed in the U.S. in 1989, 74.7% was used by daily newspapers, and the rest was sold to customers including weeklies, commercial printers, shopping news, and government publications, according to the American Newspaper Publishers Assn.

Production/capacity: Newsprint production fared considerably better in the U.S. than in Canada during 1990, as U.S. producers took a greater share of the domestic market and Canadian mills suffered from strikes at several mills in the eastern region. At the same time, demand for newsprint remained sluggish throughout the year because of poor advertising lineage at newspapers. However, publishers rebuilt inventories during the early part of 1990 and kept them high throughout the remainder of the year because of mill strikes.

The combination of newsprint industry strikes and high inventories at publishers' warehouses helped keep the market relatively firm for much of 1990, despite the startup of two new newsprint machines in the U.S., which added 440,000 tpy to capacity. Another five newsprint machines amounting to 820,000 tpy of capacity are starting up during the first three quarters of 1991.

U.S. mill shipments through the first eight months of 1990 were up 10.0% from the previous year, according to the Canadian Pulp & Paper Assn. (CPPA). Canadian shipments during the same period were off 0.8%. At the same time, U.S. consumption rose a slight 1.0%.

Canadian mills supplied 53.5% of U.S. newsprint requirements in the first eight months of 1989, down from the 56.7% supply ratio of a year earlier, according to CPPA. Through August, U.S. overseas shipments fell 20.1% to 279,000 metric tons, while Canadian exports to markets other than the U.S. dropped 5.8% to 1.045 million tons.

U.S. imports from areas other than Canada were off just 1.3% through the first eight months of 1990 compared with a year earlier and represented 2.8% of total imports during that period. At the same time, U.S. domestic sources of supply met 44.9% of demand, an increase of 5.25% from 1989.

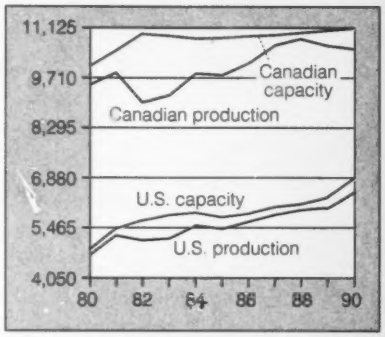
In 1989, Canadian newsprint capacity amounted to 10.020 million metric tons, and U.S., 5.695 million tons. U.S. mills, though, produce most of North America's approximately 2.2 million tons of recycled newsprint, while only one newsprint mill in Canada uses wastepaper as a raw material (though a second Canadian mill was starting up late in 1990).

Outlook: Industry forecasts don't show any significant improvement in U.S. newsprint consumption, which has been relatively flat since 1988. Inventory buildup that occurred in the early months of 1990 may take months to work down in 1991 after strikes are settled in eastern Canada, and this will probably add to an oversupply situation resulting from five new newsprint machines starting up in North America through the third quarter of next year.

Pricing: List prices rose June 1, 1990, as producers took advantage of tight market conditions caused by the threat of strikes in eastern Canada. This threat raised levels by $35/metric ton to $685 in the U.S. East. In the U.S. West, a 5% contract allowance was eliminated, effectively raising the list by $31.50 in that region. Another $35 increase is slated for Jan. 1, 1991. If successful, prices would rise to $720 in the U.S. East and to $665 in the U.S. West. Bowater Inc., however, bucked the trend and decided to lower its discounts by 4% while maintaining the current list.

List price history is as follows (U.S. East, contract, year end, per metric ton): 1974, $259; 1975, $284; 1976, $314; 1977, $331; 1978, $353; 1979, $413; 1980, $441; 1981, $500; 1982, $468; 1983, $500; 1984, $535; 1985, $535; 1986, $500; 1987, $570; 1988, $650; 1989, $650; 1990, $685.

SUPPLY/DEMAND (000 tons)



FORECAST (000 tons)

U.S.	1988	1989	1990e
Production[1]	5,982	6,088	6,475
Capacity[1]	6,115	6,280	6,808
Utilization rate	97.8%	96.9%	95.1%
Apparent U.S. consumption	13,498	13,494	13,559
lb/capita	109.8	108.7	108.3
GNP ratio	3.35	3.26	3.21
Canada			
Production[2]	10,847	10,626	10,506
Capacity[2]	10,962	11,045	11,100
Utilization rate	99.0%	96.2%	94.6%

e = *Pulp & Paper* estimate.
1. American Paper Institute.
2. Canadian Pulp & Paper Assn.

TOP NORTH AMERICAN PRODUCERS

Company	Annual capacity U.S.	Canada	Market share Total	(%)
1. Abitibi-Price	455	1,669	2,124	11.8
2. Canadian Pacific[1]	204	1,815	2,019	11.2
3. Bowater[2]	1,030	238	1,268	7.0
4. Fletcher[3]	—	1,239	1,239	6.9
5. Stone Container[4]	303	899	1,203	6.7
6. Boise Cascade	594	289	883	4.9
7. Champion	864	N	864	4.8
8. Quebec & Ontario	N	842	842	4.7
9. Kruger	N	842	842	4.7
10. Kimberly-Clark[5]	420	355	775	4.3

Market share of top five companies: **43.6%**

Market share of top ten companies: **67.0%**

Total North American capacity (1989): **17.99 million tons**

1. Includes estimated 1990 output from Gold River Newsprint Ltd. Partnership and Ponderay Paper Co. (40% owned) mills. 2. Includes Catawba Newsprint Co. (51.0% owned) and Bowater Mersey Paper Co. Ltd. (51.0% owned). 3. Combined operations of Crown Forest Industries (100% owned) and British Columbia Forest Products Ltd. (69% owned) in 1988. 4. Includes Snowflake, Ariz., mill and former Consolidated-Bathurst Inc. mills. 5. Includes Spruce Falls Power & Paper Co. Ltd. (50.5% owned).

SALES AND EARNINGS

U.S. paper industry profits drop; Canada sinks

Price erosion in containerboard and market pulp and a dismal performance from wood products operations drove third-quarter U.S. paper industry profits down 37.1% from a year ago, according to a *Pulp & Paper Week* survey of 29 companies. Rising energy costs related to the Persian Gulf crisis began to squeeze margins, while some companies also experienced operating difficulties. On the positive side, newsprint and uncoated free-sheet prices strengthened from depressed levels, and tissue remained lucrative despite strong competitive activity. Third-quarter 1990 sales rose 5.4% to $24.1 billion compared with third-quarter 1989.

U.S. paper companies with heavy exposure to wood products were left reeling from plummeting lumber and plywood prices. Since spring, lumber and plywood prices are off roughly 25% as housing starts in the third quarter dropped to their lowest level since 1982. Meanwhile, wood costs in the West remained relatively high due to supply constraints. As a result, some integrated companies reported profit declines of 50% to 70% or more from their wood products operations.

Considering the severe profit declines experienced by other major integrated companies, International Paper Co. took solace in a 15.8% decrease compared with third-quarter 1989. CEO John A. Georges said much of the company's third-quarter performance was due to contributions from its uncoated printing and writing paper business, European operations, and consumer packaging operations. "During 1990, we have benefitted from debottlenecking projects at our mills in Mobile, Ala., Georgetown, S.C., and Ticonderoga, N.Y.," Georges said. "The relative strength of our earnings this year, amidst a difficult operating climate, is directly attributable to the success of our internal improvement and acquisition programs."

Georgia-Pacific Corp. was aided by a reduction in working capital that offset higher interest payments from its acquisition of Great Northern Nekoosa. The operating profits for its pulp and paper business improved 18% in the third quarter compared with 1989. As building products operating income dropped 31%, the company noted the increasing importance of the repair and remodeling market to sustain profitability. Weyerhaeuser Co. was also dragged down by a 56% drop in earnings from building products. Pulp and paper earnings declined 22%, primarily from slumping market pulp and containerboard sales.

Operating problems haunted performances of several mills, including Bowater Inc. at Calhoun, Tenn., Federal Paper Board Co. at Augusta, Ga., and Union Camp Corp. in Savannah, Ga., and Eastover, S.C. Boise Cascade Corp.'s income plummeted 78% as modernizations at Rumford, Maine, and International Falls, Minn., added expenses at a time of declining demand. Champion International Corp. continued to be plagued by economic reforms impacting its Brazilian operations, and the company experienced labor-related operating difficulties at mills in Sartell, Minn., and Deferiet, N.Y. Among the quarter's few benefactors were Pentair Inc. and Mosinee Paper Corp., players in printing and

U.S. paper/products industry results.

	Third-quarter 1990 ($000)[1]			
Paper companies	**Sales 1990**	**% change**	**Earnings 1990[1]**	**% change**
Badger Paper	$19,647	3.6	$705	−43.6
Boise Cascade	1,054,010	−2.5	13,860	−77.9
Bowater	346,558	−3.8	23,659	−33.3
Champion	1,293,711	−1.5	62,462	−38.8
Chesapeake	215,948	5.0	3,010	−75.8
Consolidated	236,075	3.2	38,854	−7.3
Federal Paper	294,218	−0.4	21,948	−55.3
Gaylord Container (4th Q)	201,600	5.1	(5,800)	NM
Georgia-Pacific	3,430,000	29.6	95,000	−46.6
P.H. Glatfelter	151,577	5.4	20,164	−8.2
International Paper	3,300,000	13.8	181,000	−15.8
James River[2] (7/29)	1,421,421	3.8	58,850	2.8
Kimberly-Clark	1,575,100	8.4	123,300	13.3
Longview (7/31)	172,627	−2.9	18,185	0.5
Louisiana-Pacific	450,900	−11.6	21,200	−58.8
Mead[2]	1,268,200	5.9	45,800	−34.3
Mosinee Paper	51,715	−10.1	3,332	14.5
Pentair	300,681	0.2	9,456	18.8
Pope & Talbot	140,950	−12.4	3,541	−73.2
Potlatch	314,259	0.3	24,701	−29.7
Scott Paper	1,331,500	6.6	64,800	−55.6
Sonoco Products[2]	415,555	3.2	(28,881)	NM
Stone Container	1,428,600	4.0	19,700	−72.0
Temple-Inland[2]	604,500	22.9	56,500	1.6
Union Camp	707,774	6.1	51,588	−32.2
Wausau (8/31)	85,444	2.9	4,293	1.8
Westvaco (8/28)	592,888	5.0	47,516	−14.4
Weyerhaeuser	2,263,508	−12.1	90,566	−45.7
Willamette	483,628	−0.6	31,274	−40.9
Total	**$24,152,594**	**5.4%**	**$1,095,583**	**−37.1%**

1. Income after taxes, from continuing operations, excluding most significant nonrecurring items where possible. ( ) = loss. NM = not meaningful.
2. **James River Corp.** 1990 income adjusted to exclude restructuring charge of $143.6 million after tax. **Mead Corp.** 1989 income includes a $15.5-million gain related to the sale of businesses. **Sonoco Products Co.** 1990 income includes after-tax restructuring charge of $55 million. **Temple-Inland Inc.** 1990 income includes gain of $200,000 from property and equipment.

specialty paper markets.

"Last year's difficult decision to restructure the company paid off," said Mosinee CEO Richard L. Radt. Orders remained adequate for full operation despite thin backlogs, according to the company. Pentair enjoyed an 18.8% boost in profits to $9.4 million as sales in premium paper markets, including recycled-fiber paper, raised operating income by 61%, the company commented.

Containerboard woes. While Temple-Inland Inc. held its ground in the quarter, its containerboard operating earnings were down 33% from 1989. The company said its slight rise in net income was due to a lower tax rate resulting from consolidation of a bank subsidiary. Gaylord Container Corp. suffered a net loss of $5.8 million in the quarter from effects of higher fiber costs and an increase in net interest expense, the company said.

Price discounting on newsprint, linerboard, and market pulp ate into Stone Container Corp., as profits plummeted 72%. The company said it successfully raised prices on newsprint and retail bags in the third quarter and recently implemented a $30/ton increase on domestic and export linerboard, which is being followed by an increase on corrugated boxes. Chesapeake Corp. saw declining prices for containerboard as well as lower production (resulting from maintenance downtime in the third quarter) but noted that its new tissue machine in Wisconsin performed "ahead of expectations."

A restructuring program at Sonoco Products Co. cost the company $55 million and 500 jobs worldwide, said president Russell C. King. Despite a $29 million loss in the third quarter, the restructuring program, when completed, should save $20 million annually before taxes. A maintenance shutdown at Potlatch Corp.'s Cypress Bend, Ark., mill was expected to have an even larger impact on fourth-quarter results, coupled with downtime at Lewiston, Idaho.

Tissue retains strength. The elimination of its Spruce Falls Power & Paper Co. joint venture from consolidated results boosted Kimberly-Clark Corp.'s third-quarter profits, which rose 13.3% on the strength of the personal care businesses in North America. K-C said that operating margins were better than forecast because of strong performances in certain product lines and the efficient operation of its Coosa Pines, Ala., newsprint mill. Marketing costs increased substantially over third-quarter 1989, K-C said, with promotion of Kleenex premium bathroom tissue starting in early September.

High manufacturing and operating costs at the S.D. Warren Div. continued to weigh down Scott Paper Co., despite an all-time quarterly record for sales for Scott Worldwide's personal care and cleaning business. The S.D. Warren Div.'s sales dipped 4%, Scott said, citing "manufacturing instabilities" at Muskegon, Mich., and Skowhegan, Maine, where expansion projects are close to completion. The U.S. tissue business had an excellent third quarter, the company noted, but income was hurt by general inflationary pressures and "higher marketing expenses related to strong competitive activity."

Profits in Canada nonexistent. Canadian paper industry profits in the third quarter were practically a contradiction in terms as the strong Canadian dollar and an economic recession continued to plague producers. A preliminary survey of 14 Canadian pulp and paper companies by *Pulp & Paper Week* revealed a net loss of C$49.9 million compared with a gain of $287.1 million in the third quarter of 1989. Sales were down almost 11% to C$5.2 billion in 1990 compared with the previous year, the survey showed. The quarter was especially devastating to Noranda Forest Inc., which reported a net loss of $40 million as markets withered in all forest products categories, especially lumber products and woodpulp. The loss also reflected a sharp cutback in pulp production in the third quarter as part of an attempt to reduce inventories.

Abitibi-Price Inc. again lost money, $700,000 in third-quarter 1990, compared with a gain of $13.6 million in 1989. The company said it was hurt by a four-week labor strike at seven mills and soft markets for many products, namely printing paper. Newsprint markets tightened due to the strike, and directory and supercalendered grades were also bolstered in the quarter, the company said. Canadian Pacific Forest Products Ltd. also cited its labor problems as part of a 98% decline in third-quarter income compared with the previous year. Equity in losses of two new joint-venture newsprint mills continued to reduce earnings as kraft pulp and uncoated mechanical paper markets also preformed poorly, the company said. Canada's only successful paper manufacturer was Scott Paper Ltd., which saw income rise 13.5% in the quarter to C$3.8 million. The company enjoyed a "better than expected" contribution from its new Crabtree, Que., recycling plant, which started up in May. ■

Canadian paper/products industry results.

	Third-quarter 1990 (C$000)[1]			
Companies	**Sales 1990**	**% change**	**Earnings 1990**	**% change**
Abitibi-Price	$756,800	−7.3%	$ (700)	NM
Canadian Pacific	605,100	−14.5	1,000	−97.8%
Canfor Corp.	196,600	−22.7	(13,700)	NM
Cascades	209,921	22.2	4,415	−6.7
Crestbrook Forest	51,373	−26.1	3,390	−61.6
Domtar Inc.	574,000	−10.3	(22,000)	NM
Donohue Inc.	139,900	−8.4	5,300	−45.4
Fletcher Challenge	255,500	−28.9	4,000	−86.0
MacMillan Bloedel	719,400	−12.1	6,200	−90.5
Malette		—		—
Noranda Forest	1,078,000	−9.4	(40,000)	NM
Repap	321,900	−3.0	4,500	−77.0
Rolland Inc.[2]	98,570	−8.5	(7,411)	NM
Scott Paper Ltd.	123,308	−1.3	3,833	13.5
West Fraser Timber	135,500	−8.4	1,200	−88.6
Total	**$5,433,372**	**−10.9%**	**($48,973)**	**NM**

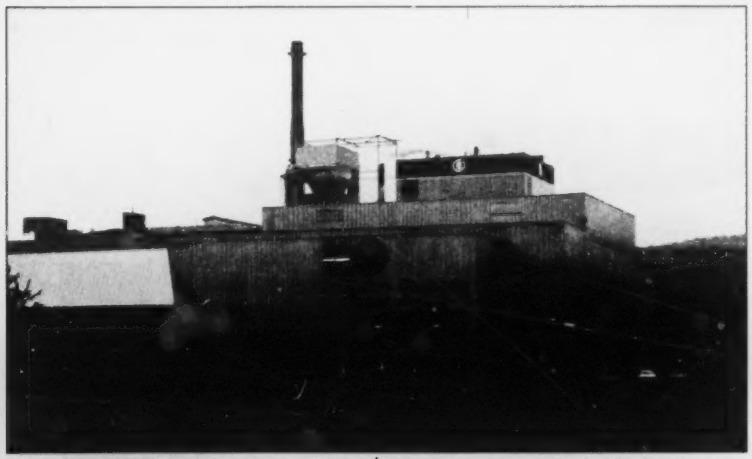
1. Income after taxes, from continuing operations, excluding most significant nonrecurring where possible. ( ) = losses. NM = Not meaningful.
2. **Rolland Inc.** 1990 income includes C$5.7 million provision related to previously reported planned closure of the Mont Rolland, Que., mill.

COATED PAPER

Boise delays Rumford expansion

Boise Cascade Corp. in late October delayed approval for its planned 318,000-tpy coated groundwood paper machine at Rumford, Maine. Final approval for the $450-million project may be delayed for as much as a year, the company said. Boise's decision was based on unfavorable economic and market conditions. The postponement means that no new coated groundwood capacity is scheduled to come online in North America between now and the beginning of 1994, despite generally favorable demand growth. Board approval is now slated for February 1992, and construction would begin shortly thereafter, with completion scheduled for 1994.

Boise first announced the project last year, the first of series of North American projects talked about for the early to mid-1990s. It is now the last to be postponed, following similar decisions at Blandin Paper Co., Bowater Inc., and Fraser Inc. Together, those three machines would have represented about 600,000 to 700,000 tpy of new capacity, had they gone forward. ■



Boise Cascade delayed a coated groundwood paper expansion project at its Rumford, Maine, mill, possibly until 1994.

Repap teaming up with Sierra Club

Repap Enterprises Inc. made a deal with the nemesis of most papermakers—the Sierra Club, which will print its bimonthly magazine on Repap's new recycled lightweight coated paper. This unusual alliance came about because Repap sells its No. 4 coated groundwood, 50-lb offset at virgin fiber prices, rather than the usual 5% to 10% premium charged on recycled grades, thus keeping the magazine's paper costs within budget.

The Sierra Club has struggled with the issue of virgin-fiber paper vs recycled paper but, until now, said that no products met all the criteria to allow the switch. The Sierra Club was attracted to printing quality and the guarantee of a minimum 10% post-consumer waste fiber content. ■

NEWSPRINT

Major producers join newsprint price hike

At the end of October, Kimberly-Clark Corp. and Quebec & Ontario Paper Co., as well as other producers, added their support to the newsprint price hike slated for Jan. 1, 1991. Although a few manufacturers still had not yet announced, those who did made up over 90% of North American newsprint capacity.

Except for Bowater Inc., North American newsprint manufacturers have told customers that list prices will go up $35/metric ton to $720 in the U.S. East and $665 in the U.S. West for 30-lb newsprint. Bowater, however, plans to lower discounts by 4% while maintaining the current list of $685 in the U.S. East. ■

LABOR

Canadian strikes, negotiations drag on

Despite a breakthrough compromise reached between the Canadian Paperworkers Union and Abitibi-Price Inc., contract negotiations in eastern Canada were set back by an Oct. 11 strike of 1,700 employees at Canadian Pacific Forest Products Ltd.'s massive Thunder Bay, Ont., pulp and paper complex only two days after Abitibi workers returned to work at seven previously struck locations. Strikes also continued at CPFP's mills in Gatineau, Que., and Dalhousie, N.B., at Quebec & Ontario Paper Co.'s Thorold, Ont., recycled newsprint mill, and at Rothesay Paper Ltd. in St. John, N.B., which is unrelated to the pattern negotiations.

Canadian workers continued their opposition to pattern contract provisions that call for operating mills on two statutory holidays and give companies greater flexibility in assigning work to tradesmen. Abitibi gained the flexibility provision at the expense of needing union approval to operate the mills on New Year's Day and Labor Day, but workers at other mills appeared to be vehemently opposed to even a compromise on the holiday and flexibility issues.

The CPFP strike at Thunder Bay, coupled with resumption of operations at Abitibi's mills and concurrent strikes at the four other locations, left 17% of total Canadian newsprint capacity idle as of early November, not much of an improvement from around 23% that was off the market in late September. A Canadian Pacific spokesman said the company presented its final offer to the workers on Oct. 10. The issues at Thunder Bay were believed to be similar to the other mills. As of early November, new contracts had been ratified at about 18 of 50 pulp and paper mills represented by CPU in eastern Canada.

And trouble was also brewing at Stone-Consolidated Inc.'s Port Alfred Div. in Ville de la Baie, Que., where Quebec's other major paperworkers union, Le Federation des Travailleurs du Papier et de la Foret (Federation of Paper & Forestry Workers), rejected the company's final contract offer at the end of October. FTPF also had rejected a final offer at Donohue Inc.'s Clermont, Que., mill, and negotiations were dragging at Abitibi's Alma,

Que., mill, at Domtar Inc. at Windsor and Donnaconna, Que., and at Kruger Inc.'s Bromptonville, Que., mill. Abitibi also had yet to settle an agreement with the United Paperworkers International Union at Pine Falls, Man.

The Canadian media reported a developing schism between the CPU leadership and workers at Quebec & Ontario Paper's Thorold mill, where 500 workers struck Aug. 14 in opposition to the holiday and job flexibility provisions contained in the pattern agreement. Local Thorold union leaders believe the CPU executives have "morally" abandoned the membership despite continued financial support for the strikers, *The Globe & Mail* reported.

CPU has been plagued by a lack of cohesiveness during the strike, with Ontario workers solidly opposed to provisions that have sailed through locals at Quebec area mills. An FTPF spokesman surmised that in both of the unions, the executives need to be reeducated about the demands of membership.

"People are not very satisfied with their contracts," the spokesman said. "We need to have more discussions with the members."

Q&O spokesman Gary Smith said the company was "caught in the middle" of the disagreement within CPU, and the strike at Thorold occurred "too early in the game."

"We want a contract based on the Stone pattern," Smith said.

Meanwhile, both sides in the protracted strike at Rothesay Paper Ltd. in St. John, N.B., which is unrelated to the pattern bargaining, were called together by a provincial conciliator. But a union negotiator said little progress had been made after several meetings.

"There is no light at the end of the tunnel," the contact said. ■

Canadian mills closed by strikes.

Company/mill	Number of workers	Capacity (metric tpy)	Grade(s)
Canadian Pacific Forest Products			
Thunder Bay, Ont.	1,500	417,000	Newsprint
Dalhousie, N.B.	775	340,000	Newsprint
Gatineau, Que.	1,250	565,000	Newsprint
Quebec & Ontario Paper			
Thorold, Ont.	500	310,000	Newsprint
Rothesay Paper			
Saint John, N.B.	400	320,000[1]	Newsprint
Newsprint capacity down		**1,792,000**	
% of total Canadian newsprint capacity			**17%**

1. Company is operating one of two machines.

Union coalition ratifies pact at Rayonier-Jesup

A three-union coalition representing over 800 workers at ITT Rayonier Inc.'s Jesup, Ga., paper mill ratified a new five-year contract Oct. 5 that lifts wages about 13% by 1995. The unions approved the pact by a "wide margin" the company said. Wages will go up 3% in the first and fifth years of the contract and 2.5% in each middle year.

"We are happy that the result was a mutually agreeable package," said a spokeswoman for ITT Rayonier. "We're looking forward to five years' stability."

The contract also included shift differentials, some improvement to benefits, and modifications to working conditions. The union coalition involves more than 700 members of the United Paperworkers International Union as well as members of the United Assn. of Plumbers & Pipefitters and the International Assn. of Machinists. Another union, the International Brotherhood of Electrical Workers, bargains separately.

Meanwhile, the strike at Rayonier's Hoquiam, Wash., pulp mill continued into its eleventh week last month with no new negotiations scheduled. About 270 members of AWPPW Local 169 struck the Hoquiam mill Aug. 26 over issues surrounding a two-tier wage and benefit structure. ■

KRAFT PAPER

McDonald's will switch to unbleached bags

McDonald's Corp. has notified its suppliers that it will convert all of its carryout bags to unbleached kraft paper from the current bleached kraft paper beginning in the first quarter of 1991. Last August, McDonald's agreed to work with the Environmental Defense Fund to reduce packaging waste, promote recycling, and make greater use of materials, such as unbleached and recycled paper, that are less damaging to the environment. McDonald's napkins and Happy Meal boxes already use recycled paper, but the company has been a frequent target of criticism for using nondegradable polystyrene packaging and contributing to the solid waste problem.

Kraft paper marketing executives were surprised that McDonald's has moved so quickly to switch its bag packaging. "The fat is in the fire," said one observer. Last month, McDonald's was already using natural kraft bags made from 100% recycled fiber for a nationwide promotion of its McRib sandwich, and this month the company will begin testing carryout bags containing 65% postconsumer newsprint at over 500 restaurants in the New York area. Most bag suppliers were equally surprised at McDonald's goal that the natural kraft bags delivered in early 1991 should initially contain as much as 50% recycled wastepaper, increasing to 100% recycled content in the second quarter.

The decision by McDonald's will have a major impact on the kraft bag market. Fast-food restaurants, bakeries, and delicatessens are the largest users of bleached kraft bags, accounting for an estimated 140,000 tpy, or 55%, of the 255,000 tons of bleached kraft bag and sack paper shipments in 1989. Although McDonald's shift will give impetus to the natural kraft paper market, it will hurt the small number of bleached kraft paper producers. Furthermore, some kraft paper mills that do not have recycling systems will be dropped as suppliers of bag paper for McDonald's. The development of 100% recycled kraft paper has been pioneered by a number of small recycled mills. ■

Complex Equipment, New Methods Make Maintenance Training More Important

Survey of North American pulp and paper mills shows commitment to program depends on company, but most support more training

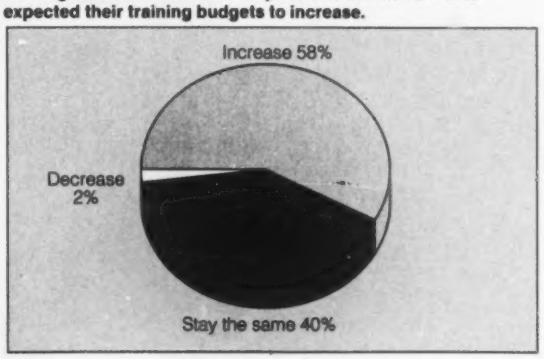
By KELLY H. FERGUSON, Projects Editor

To say that pulp and paper mills have become more sophisticated within the last decade would certainly be an understatement. A look at a process control room of the early 1980s compared with one of today emphasizes the difference in equipment only a decade can make. But process control is certainly not the only area that has changed. Constant research and improved technology have caused redesigns and modifications from the chipper to the roll wrapping system.

Improvements in the pulping and papermaking process have brought changes in the way equipment is maintained. Equipment must be constantly checked and fine-tuned to meet a mill's production and quality goals. Predictive and preventive maintenance is now standard operation at most mills, and sophisticated tools are used to analyze complicated equipment.

Are maintenance employees ready to handle these tools and maintain this complex equipment? A survey of North American pulp and paper mills shows that if employees aren't ready when they report for work, then most companies are willing to spend time and money to train them.

FIGURE 1: **The majority of survey respondents indicated that training would receive more emphasis in the future—58% expected their training budgets to increase.**



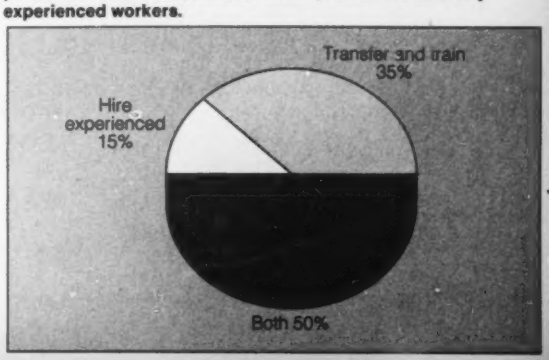
To give an example of maintenance training practices in the pulp and paper industry, *Pulp & Paper* surveyed mills on such topics as how their programs were developed, how much time is spent on training, and what major topics are covered. Mills from 21 U.S. states and three Canadian provinces were surveyed. These mills include a wide representation of the industry:

- Mills representing 17 different grades
- Mills with total production ranging from 90 tpd to 2,500 tpd (short tons)
- Mills with total number of employees ranging from 150 to 2,000
- Mills representing original startups from 1895 to 1985
- Mills with total number of maintenance employees ranging from 28 to 459
- Both union and nonunion mills.

INVESTING IN TRAINING. In analyzing the survey responses, one fact certainly is clear—emphasis on maintenance training is mill or corporate specific and not really affected by any other factors. In attempting to compare mills by such categories as original startup date, union vs nonunion, grades produced, number of employees, region, or total production, no clear comparison could be made.

For example, a 550-tpd fine paper mill in one region with 250 maintenance employees spends more training hours/year/employee than a 2,260-tpd fine paper and coated board mill in another region with 460 mainte-

FIGURE 2: **Mills indicated their emphasis on working with existing employees to fill maintenance positions. Thirty-five percent transfer and train from within, while 15% hire only experienced workers.**



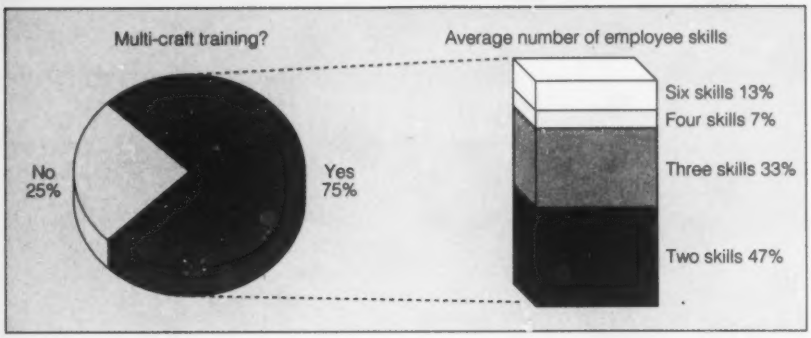


FIGURE 3: **Most mills (75%) practice multi-craft training, and a majority of those mills' employees have more than two skills.**

nance employees. It seems that only a company's commitment to training determines how extensive the program is and how much monetary support it receives.

Most of the mills responding said they had a "formal" training program for their maintenance employees (82.5%). Of the other 17.5% that termed their programs "temporary," most said they were working to develop a formal program. Another comment by those having temporary programs was that training normally occurred only when new equipment was purchased.

Analyzing training program budgets was difficult because some respondents included the total mill training budget instead of maintenance training specifically. This is understandable, though, because some mills have official training departments to handle all mill training. Attempts to figure an average dollar amount based on the number of maintenance employees were therefore impossible. Another possible reason for the wide swings in responses is variations in corporate support. For example, a mill with 90 maintenance employees listed its training budget at $290,000 ($3,222/employee) while a mill with 437 maintenance employees budgeted $500,000 ($1,144/employee).

Most of the respondents (58%) were optimistic that their training budget would increase in the next two years, and 40% expected it to stay the same. Only 2% said their training budget would decrease (Figure 1). A reason given was that the mill recently went through a major expansion and its training budget was increased dramatically for the one- to two-year expansion phase.

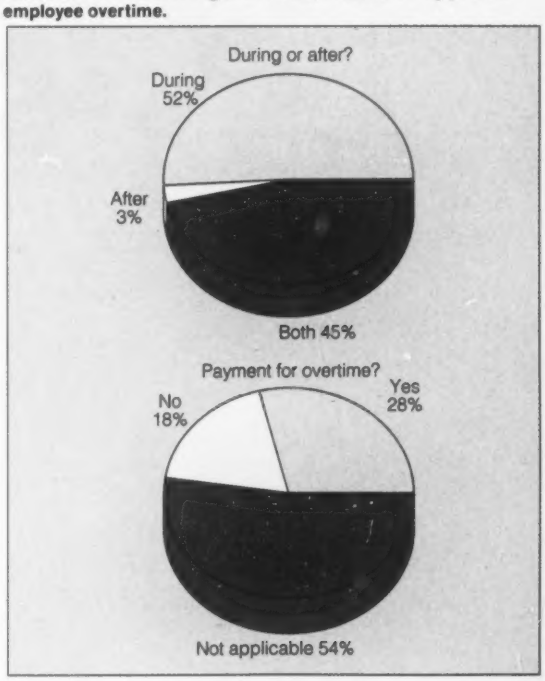
A PROGRAM TAKES TIME. Responding mills train their maintenance mechanics an average of 55 hours/year, E&I personnel 88 hours/year, and maintenance supervisors 49 hours/year. Most of the mills said they also have apprenticeship programs of two to four years to train inexperienced employees. To maintain a healthy maintenance staff, mills either transfer from within other mill departments (35%), hire experienced maintenance employees from outside the mill (15%), or utilize both methods (50%) (Figure 2).

Reflecting the trend in maintenance departments toward multi-craft employees, trainees at 75% of the mills go through multi-craft training (Figure 3). Most of the maintenance employees have two skills (47%), three skills (33%), four skills (7%), or six skills (13%). Multiple skills mean more pay at some mills, with 37.5% of the mills paying maintenance employees for the number of skills they have.

Training normally occurs during working hours—52% of mills responding said they conduct their training programs during working hours only, and another 45% conduct their programs both during and after regular working hours (Figure 4). Only 3% run their programs after hours only. Of those same mills, 28% said when they train after hours, they pay for overtime. At 48% of the mills, completion of the training program is not rewarded. However, 20% of the mills reward employees with a wage increase, and 33% reward with both a wage increase and a promotion of some type (Figure 5).

A WELL-DESIGNED PROGRAM. Various options for developing a training program are available for pulp and

FIGURE 4: **Most training occurs during normal working hours, and of those mills training after hours, most said they paid for employee overtime.**



paper mills—training companies and consultants are willing, at a price, to aid mills in designing a total program. Equipment vendors usually offer some training with purchases. State agencies also usually offer their resources and assistance as an incentive for further expansion in the state. For example, Southeast Paper Manufacturing Co. in Dublin, Ga., Alabama River Newsprint in Claiborne, Ala., and Newsprint South Inc. in Grenada, Miss., all have utilized state resources to develop and conduct training programs.

An option many surveyed mills mentioned was local vocational/technical schools or area colleges. These schools are especially valuable for teaching fundamentals to inexperienced employees.

Most mills (62%) said they developed their maintenance training program with the help of a consultant, and 33% said the program was designed by the mill itself or based on a corporate program. Only 5% said they left development to a consultant.

On-the-job training is still the most utilized method for training maintenance employees. Respondents were asked to rank in importance training methods from seven categories: in-house seminars conducted by employees, in-house seminars conducted by a consultant, offsite seminars, video training, on-the-job training, interactive video training, and other methods.

On-the-job training was chosen by 46% of the respondents as their primary training method (Figure 7). The second choice was in-house seminars conducted by consultants (23%), followed by in-house seminars conducted by employees (18%), outside seminars (5%), and videos (3%). Other methods included local colleges or technical schools and state programs, and one mill used a self-study program. Almost all methods were used by all mills responding. Even interactive video, a relatively new technology in training, was either the third, fourth, or fifth choice for 20% of the mills.

Training manuals, normally a centerpiece of any training program, are developed in various ways (Figure 8). Twenty-six percent of respondents developed their manuals in-house using the expertise of employees to put information together. Thirteen percent relied on vendor-provided manuals, and 11% relied only on consultants. The remaining 50% was divided in a number of combinations of in-house, consultants, and vendors. Of those mills using a combination approach, mill/vendor and mill/consultant teams composed 16% each. Twenty-six percent used vendors and consultants, and 42% used a mill/consultant/vendor team.

Videos are also a popular training method—almost all respondents said they used videos as part of their maintenance training. These videos are most often purchased from a training company (72%). However, with video recording equipment prices decreasing and with more "would-be directors" becoming proficient using that equipment, mills are developing their own site- and equipment-specific maintenance videos. Twenty-one percent of the respondents said they worked in tan-

FIGURE 5: **Incentive can sometimes be an important factor in training. Most mills offer either a wage increase or an increase and promotion for completing training.**

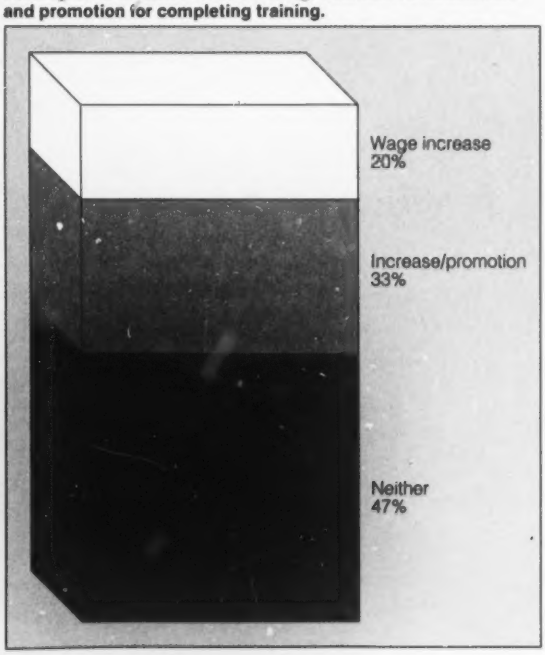


FIGURE 6: **Designing a training program is normally accomplished by a mill/consultant partnership, but 33% of the mills developed their programs alone.**

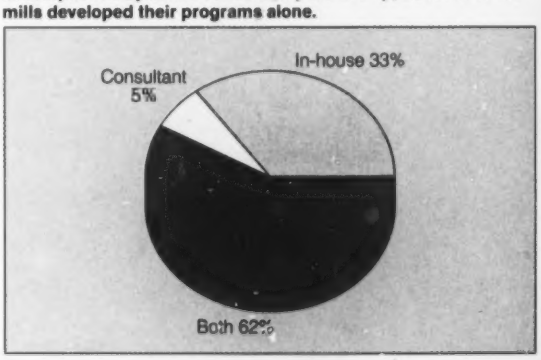
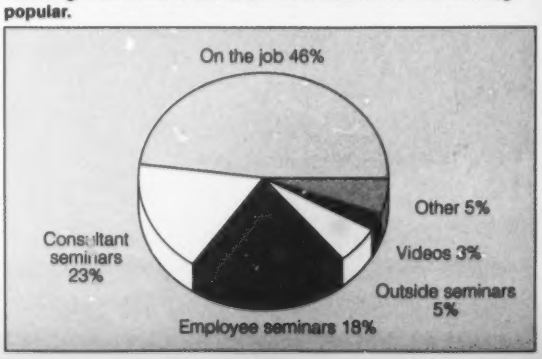


FIGURE 7: **On-the-job training remains the primary method for teaching maintenance skills. But seminars are also becoming popular.**



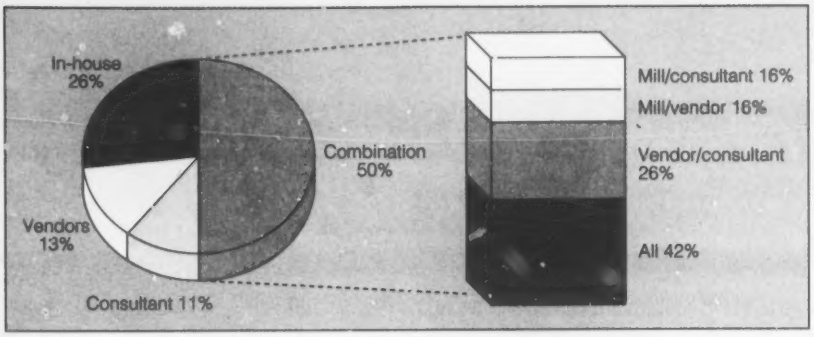


FIGURE 8: **Training manuals are an important part of any training program. In developing these, mills remain involved, and 26% write their own manuals.**

dem with training companies to develop videos, and 8% said they produced the videos themselves.

As training has become more formalized in the industry, more mills have set aside or added facilities dedicated to training, sometimes including special areas for hands-on training within those facilities. Seventy percent of the mills said they had a facility dedicated to training on-site.

Of those that have a training facility, 50% have installed maintenance-specific equipment to aid their training classes. The equipment includes computer control simulators, programmable logic controllers (PLC), hydraulic trainers, duplicates of field instrumentation equipment, simulators for electrical troubleshooting, pumps for hands-on alignment and teardown, and balancing and alignment jigs. One mill commented, "We have basically the same equipment in the training facility as we have in our shops, but on a smaller scale." Mills that don't have specific facilities use the maintenance shops for hands-on training.

The equipment listed previously indicates various topics mills must cover when training their maintenance employees. Each mill may have its own emphasis for training, but most programs cover common topics. When asked to mention the five most covered topics in their maintenance training programs, respondents listed equipment alignment (47.5%) and safety (37.5%). Other major topics listed were computer controls/distributed control systems (32.5%), instrumentation fundamentals (32.5%), welding (32.5%), electrical fundamentals (30%), hydraulics (30%), bearings (25%), and a.c. and d.c. drives (20%).

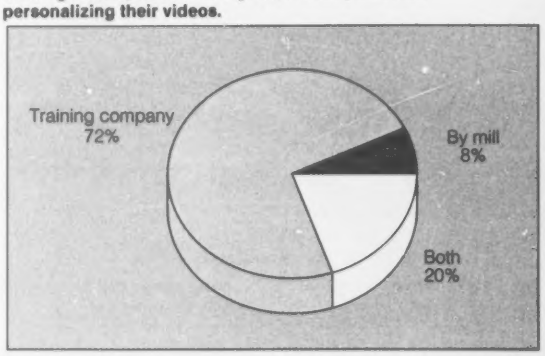
EXPERIENCE VS KNOWLEDGE. In a mill maintenance survey conducted by *Pulp & Paper* in 1980, respondents commented that new, younger applicants had a better knowledge of the trades but not enough practical experience. The 1990 survey asked the question: "It has been said that younger employees are not as well skilled as they once were. Are there any basic skills new employees are not familiar with, such as mathematics, basic electrical principles, understanding instrumentation, etc.? If so, how are these employees educated?"

About half of the respondents disagreed with the statement, which is very encouraging. Many mentioned that local technical schools or colleges were invaluable in teaching those basic skills. And many also said the mill paid for trainees to attend those classes.

Some of the comments follow:

- "Math skills. Training is provided in-house by mill employees."
- "Our maintenance apprenticeship program requires four years of night classes."
- "New employees do not have the electrical, instrumentation, hydraulic, and mechanical skills. We must train the new employees in those areas."
- "Some topics we must cover are reading, language skills, and mathematics."
- "Problem-solving skills are very weak. We [have] overcome the problem of poor skills through entrance testing."
- "We feel that the younger employees with training can easily adapt to new technology."
- "New employees need to work on math skills, writing skills, and reading comprehension. But we have no formal program for dealing with these."
- "We provide a basic math refresher course. Tests in math, electrical fundamentals, and instrumentation are given to beginners to establish the training threshold."
- "Employees need training in basic troubleshooting skills and an analytical approach to problem solving. We are developing a training program to deal with these areas."
- "By screening and testing applicants, we have been able to hire employees with the necessary skills. While this has not been a problem so far, it could be a problem

FIGURE 9: **Training companies are still the major source of training videos, but like many other areas, mills are personalizing their videos.**



in the future."

• "A percentage of the younger employees do not like responsibility and have a poor attitude toward learning. As long as they feel they have a strong union behind them for protection, they will never make a good employee. We have to work around that problem by appointing them work they are capable of performing."

PREPARING FOR NEW TECHNOLOGY. As mentioned earlier, new technologies have made a difference in the way maintenance departments operate. With a trend toward prediction and prevention, sophisticated tools have been developed—computer alignment, online conditioning monitoring, infrared analysis, etc. The survey asked mills to relate how these changes have affected their training programs and the subjects they cover:

• "More detailed training, both onsite an offsite, for our paper machine maintenance crew in vibration analysis for rotating equipment. Training of craftsmen on computer alignment."

• "We send more of our employees offsite for training, and our paper machine team undergoes more varied training."

• "We have expanded training in the paper machine area to keep abreast of new equipment and application technology. New apprentices are being taught laser alignment techniques."

• "Requires more one-on-one, in-depth training for all mechanics."

• "We have a separate in-house PPM program with a team of six to seven technicians. These technicians receive more specialty training than other maintenance employees."

• "For the more advanced technologies and maintenance equipment, we have trained a core group of employees. We're now bringing others along at a slower pace. They will be developed as far as their interest takes them."

• "We constantly upgrade our program to reflect changing technology."

• "We have used outside resources for training on vibration analysis, etc."

• "Since this is a new mill, use of sophisticated tools has been a way of life for us. Our training program is designed to offer both elementary subjects for the benefit of younger, less-experienced people and advanced topics geared toward improving skills of the more experienced team members."

• "This has increased the amount of training, but it is provided to a small specialized group as opposed to the general crew."

• "These new technologies have been added to our maintenance program, resulting in additional classroom hours required for all craftsmen during and after their apprenticeship programs. E&I employees now require more than 800 hours of classroom training." ■

Unique training methods

The final survey question was asked in an effort that mills share some of the unique aspects of their training programs—special "points of pride" that have made their programs work. Below are some of the responses:

• "Certified welding training, testing, and documentation of certified welding jobs."—Southern fine paper mill

• "When we go into a major expansion, we set up special training for E & I apprentices. We take people out of the mill, and, using in-house training, vendors, [and] vocational school classes, we develop highly skilled E & I technicians in 18 months. We have done this twice—once with 11 apprentices and once with eight apprentices—with excellent results."—Midwestern tissue mill

• "For maintenance, it is our five-year maintenance apprenticeship program. Normally, all maintenance employees are hired into the program and must show satisfactory progress with on-the-job training, and while attending formal classes at night for four years. This program has been in place since 1959, and it is, by far, the best ongoing training program at our mill. We believe it may be one of the best programs of its type in the industry."—Southern kraft bag and linerboard mill

• "It is unique in that we have not gotten a formal, planned, scheduled training program off the ground yet. We just, in the past week, received approval for specific training to improve the skills of both mechanics and electricians. This includes interactive training on hydraulics and programmable controllers. Also, we will have a dedicated area for our training equipment."—Southern board mill

• "Due to redesign projects in both E & I and mechanical areas, our training programs are being completely changed to reflect the needs of our multi-skilled mechanics."—Northeastern coated paper mill

• "From 1986 through 1989 we put our maintenance employees through a cross-craft training program. I feel this has given our work force the ability to meet our mill's maintenance needs. We keep them up to date on new technology by seminars and training programs provided by vendors."—Southern kraft mill

• "Key maintenance employees receive operator training on new processes. Electronic technician group received advanced training in E & I. They can be called to any problem millwide. Training to update and remain up to date equals about three to four months/year/man."—Southern bleached pulp and board mill

• "Solicitation of employee's ideas before selecting a subject for training purposes."—Southern tissue mill

• "Our training opportunities can be divided into two types: 1) Advancement By Competency (ABC): This training is done on team members' own time. By completion of designated modules and time on the job, a team member can advance through 11 pay steps to reach the top pay step. Most of the modules are "generic" to the types of equipment found in pulp and paper mills; 2) Company-sponsored training: This training is paid for by the company and focuses on specific topics for which specific needs exist within the mill."—Southern pulp mill.

New Corrugated Box Rules Could Mean Big Change for Containerboard Mills

Modified corrugated box regulations based on edge crush rather than bursting strength of the walls are expected to be approved in early 1991

By COLE ROWLAND

Regulations governing the construction of corrugated shipping containers used in commercial truck and rail shipments have, since their inception in 1906, been based on basis weight and the bursting strength of the walls of the container. Bursting strength, as measured by the mullen test, measures the ability of the container walls to resist rupture.

While bursting strength of the box may have been the critical specification in box design in the past, box makers, box users, and carriers all seem to agree the most important design criterion for corrugated boxes today is vertical compression strength.

Box makers, box users, shippers, and regulators have agreed for some time that box shipping regulations should be changed to include a criterion for edge crush of the combined board. Edge crush correlates with both the ring crush of the linerboard and the top-to-bottom compression strength of the finished box. However, achieving a change in the shipping regulations has proved to be an elusive goal.

WHY REGULATIONS? The regulations themselves were initiated by the Freight Classification Committee of the railroads shortly after the turn of the century. These regulations are now contained in Rule 41 of the railroads' Uniform Freight Classification.

For many years, the trucking industry had no comparable regulations to Rule 41 of the railroads. As the truck lines increased their share of commercial shipments at the expense of the railroads, their acceptance of shipments packed less securely than required by the railroads was a means of competing with them for business. Damage claims eventually forced the truckers to adopt their own set of rules, similar to those of the railroads. These are contained in Item 222 of the National Motor Freight Classification, published by the National Motor Freight Assn.

Under both common and statutory law, a common carrier is responsible for loss, damage, or injury to the goods it accepts while those goods are in the carrier's possession. To protect themselves from this liability, the carriers are allowed, under the authority of the Interstate Commerce Commission, to establish rules defining the minimum construction of shipping containers.

Some 95% of all manufactured products are packed in corrugated cases, and the preponderance of all goods presented for commercial shipment are in corrugated boxes. While the purpose of the regulations is to allow the settlement of damage claims, in the absence of other regulations or standards, the rail and truck regulations have for many years been accepted as the standard for corrugated box manufacture in this country.

REASONS FOR CHANGE. Several reasons exist for changing the shipping regulations for corrugated boxes, and some of these are outlined below:

Changing transportation environment. When the railroads first defined their shipping regulations, goods were mostly loaded on the floor of railcars by hand in individual packages. Now, most shipments are unitized and handled by forklift or mechanical conveyor. Unitized loads are stacked high in warehouses under a variety of atmospheric conditions.

The trucking industry has gone through times of economic stress since its deregulation during the Reagan administration. The pressure to load trucks to capacity has increased as the competitive pressures have intensified. The various energy crises have added incentives to ensure loads approach capacity in every case.

Changing primary packages. The replacement of rigid primary packages with nonrigid packages has been a well-established trend in the U.S. for some time. Pouches and other flexible packages have offered economical alternatives to certain rigid paperboard packages, particularly in the prepared foods area. More importantly, blow-molded containers have replaced rigid steel, paperboard, and glass packages in a number of major applications.

An example is retail motor oil, which in the 1970s

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was packaged entirely in steel and composite cans. Within the span of only about four years, the cans have been virtually 100% replaced by blow-molded bottles. While the cans were self-supporting, the quart bottles depend upon the compression strength of the shipping container for support in stacked loads. Similar conversions have also taken place in cooking oil, syrup, and soft drinks.

Solid waste source reduction. Boxes made with high-performance containerboard (HPC) may save 20% of the fiber used to make boxes with comparable stacking strength made from traditional linerboard and medium. This is an important means of responding to pressure from customers and legislators for packaging source reduction.

The containerboard industry has a potential problem with respect to its role in the nation's municipal solid waste crisis. In 1940, about 40% of the raw materials consumed by the containerboard industry were recycled materials. In response to the demand for greater performance in corrugated packaging, the percentage of recycled materials consumed in U.S. containerboard had dropped to 23% by 1989. The American Paper Institute (API) expects that figure to increase to 25% this year and 35% by 1995.

These are ambitious goals for an industry that competes on the basis of strength and performance, and it is conjectural whether, if achieved, they will be sufficient to keep various government bodies from mandating secondary-use quotas.

The corrugated box industry has an excellent story to tell in terms of the percentage of used boxes recovered and recycled. Old corrugated containers (OCC) recovery was more than 45% in 1988, compared with some 33% for newspapers, and the recovery rate for OCC increased to more than 50% in 1989.

Still, many in the containerboard and corrugated box industries consider themselves prime targets for mandated quotas for use of more recycled raw materials because corrugated represents such a large share of total municipal solid waste. Figure 1 shows corrugated boxes are by far the largest single paper product entering the solid waste stream, accounting for more than 23 million tons in 1988. The next highest volume among paper products was newspapers at just over 13 million tons.

In terms of discards (unrecovered materials), corrugated boxes are about as large as total food wastes, and almost as large as all plastic material wastes combined (Figure 2).

Raw materials conservation. Offering edge crush as an alternate criterion in the shipping regulations would help conserve containerboard raw materials in two ways. One is the reduction of overpackaging, which one industry executive believes is present in 50% of all 200-lb test containers. Because the current regulations use basis weight and bursting strength as their criteria, containerboard machines must be run to optimize these specifications rather than ring crush.

Consequently, box users interested in compression strength may be forced by the existing regulations to

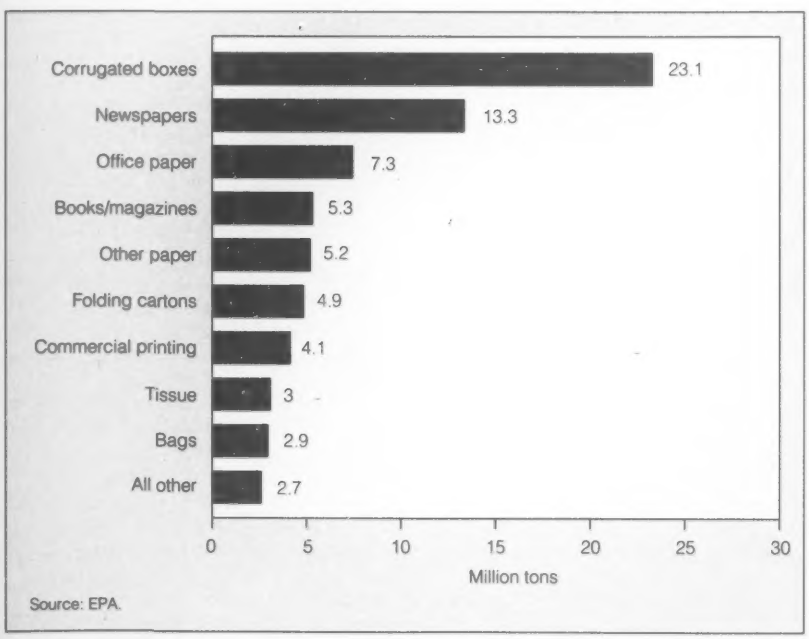
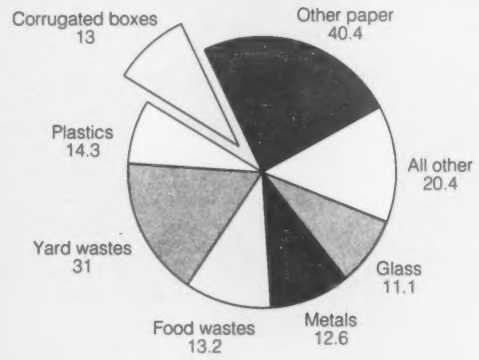


FIGURE 1: **Paper and paperboard products generated in MSW—1988.**

FIGURE 2: **Landfill volume of discards in MSW—1988 (million tons).**



Source: American Paper Institute.

buy more fiber than would be needed if the liner were run to a ring crush specification. The new high-performance (high ring crush) grades of linerboard typically produce ring crush test results comparable to conventional grades of linerboard at basis weights 15% to 20% below those of the conventional grades.

Secondly, the high-performance grades of linerboard are much more tolerant of hardwood fiber in the furnish than are grades of linerboard run to a mullen specification. The addition of hardwood fiber to the furnish has been found to improve the ring crush results of linerboard, apparently because of the bonding characteristics of the hardwood fibers. This seems to be especially true if the linerboard machine is equipped with a high-intensity press. Since hardwood is an underused resource in southern pine timber stands, an alternate edge crush criterion in the regulations would help conserve the relatively scarce and valuable softwood species.

Lower cost to box users. The economics of using high-performance linerboard in box making are such that overall cost savings are typically shared among the containerboard producer, the box plant, and the box user.

Currently, high-performance linerboard is priced at a premium over conventional grades of linerboard by most producers of the HPC grades. Although the HPC grades sell at a premium per ton over conventional grades, their basis weight for a given level of ring crush is sufficiently lower than the conventional grades that the price increase per ton of paper is more than offset by the increased yield of ft^2 from each ton.

These savings may be kept by the box maker, improving that company's margin. In the very competitive world of corrugated box converting, however, the box plant will more likely share these savings with the box customer, who then receives a box with equivalent stacking performance at a lower price or better stacking performance at the same price.

Avoiding obsolesence of the regulations. During the 1980s, containerboard pricing made greenfield linerboard mill developments difficult to justify. New capacity came primarily in the form of machine rebuilds and, to a lesser extent, new machines at existing sites.

Two technologies that have dominated linerboard capital projects in recent years are high-intensity pressing and multi-ply forming. It happens that both of these technologies may be used very effectively to enhance the ring crush performance of the sheet.

While it may be going too far to suggest that ring crush performance was the principal reason for the choice of these technologies, their popularity has certainly fostered the availability of, and interest in, high ring crush containerboard.

The explosion of interest in HPC and the large number of permit applications for special packages exempt from regulations threaten to outflank existing regulations.

EARLIER ATTEMPTS TO CHANGE THE RULES. The proposal currently being drafted by the Fiber Box Assn. (FBA) and the Assn. of Independent Corrugated Converters (AICC) is the third attempt to change the shipping regulations for corrugated boxes since 1983.

In 1983, FBA and the Fourdrinier Kraft Board Group of API docketed proposals with the rail and motor freight classification committees requesting that an alternate set of criteria be added to the existing rules. These alternate criteria involved two changes to the existing rules. First, a 20% reduction in mullen specifications was requested to allow greater use of hardwood fiber in linerboard production. Second, a new edge crush specification was proposed in addition to the mullen specification.

The proposals generated a great deal of controversy, both within the paper industry and from box users. The edge crush values were based on an industry survey of actual box production performed by the Institute of Paper Chemistry and were intended to be minimum values. Wording in the proposals, however, described the values as "minimum averages," rather than minimums.

One paper industry executive criticized the proposed rule as downgrading industry quality by allowing "... the stacking strength built into today's boxes to be reduced 17% to 25% and still meet the test." The proposed reduction in bursting strength was also strongly criticized as an attempt to downgrade the overall quality level of the corrugated industry.

The chairman of the Rail Classification Committee wrote the parties to the Docket Subject a letter in November 1983 recommending disapproval of the paper industry proposal. He said, "While there was support for the proposed amendment, the record shows significant opposition from the greater preponderance of shippers and box makers. Moreover, numerous rail carriers have advised their opposition.

"In general, the negative comments indicate opposition to the proposed amendment for the reason that the

reduction in bursting tests, coupled with the change to average, rather than minimum, compliance criterion, would result in a degradation of specifications and box performance. In addition, there was opposition to the proposed edge crush levels on the grounds that the proposed values are not representative of current commercial board capabilities.

"This committee is inclined to the opinion that the edge crush test is a valid specification concept. However, it is the view of the Committee that the reduction in bursting tests, in combination with the proposed edge crush test levels, would not serve to provide a satisfactory basis of specifications . . . the Classification Committee has concluded to recommend that [the proposal] be disapproved."

Within a short time, the paper industry submitted a revised proposal to the classification committees. The new proposal again requested a 20% reduction in bursting strength requirements, but the edge crush requirements were modified. Before being submitted to the classification committees, the new proposal was to be field tested through a program entitled, "A Test Program for Corrugated Boxes," involving limited production of the "new board" and its use in producing containers that would be shipped under test permits from the classification committees.

The program was not supported by box makers or box users. Less than a dozen test permits were issued over the three-year life of the test program, and little data of any use were collected.

The independent corrugated box producers were suspicious of changes proposed by FBA and API for several reasons. They saw benefits for the containerboard producers under the proposals but little incentive for them or their customers to support the changes. The independents feared that producers of the "new board," or high-ring-crush linerboard, would restrict the availability of the new linerboard grades to their own box plants or discriminate against the independent box producers through pricing of the new board grades.

THE NEW PROPOSAL. With continued interest in the edge crush test among shippers and carriers, and without any new initiatives from the box industry, the rail classification committee in 1989 drafted a new proposal and submitted it to the box industry and shipper groups for review and comment.

The stated intention of the committee, according to its chair at the time, was " . . . to create some movement toward the eventual goal of publishing a modernized rule with more emphasis on box compression strength."

Changes in the committee's draft proposal included the following:

- Edge crush requirements as an alternative to the current burst test requirements
- Increases in box size and weight limitations, mainly for double-wall and triple-wall board
- Inclusion of three new grades of triple-wall board
- Provisions for the new high-strength linerboards
- "Cleaning up" the rule by the removal of numerous obsolete and extraneous requirements, such as replacement of four pages of detailed box closing specifications with general closing requirements
- Rearrangement of the various sections of the rules so that they progress from basic corrugated fiberboard and box construction and specifications through interior packaging requirements and end with box closing, certification requirements, and definitions.

The response from the paper industry trade associations to the committee's draft proposal was positive, with certain reservations concerning proposed test values and procedures.

The schedule of edge crush values in the draft proposal concerned API. As many as 20% to 22% of all U.S. box orders could have failed the proposed edge crush criterion, based on what API believed to be current U.S. corrugated box performance.

API was reluctant to endorse a schedule of edge crush standards that would rule out almost one quarter of current U.S. box production, for fear of being accused of trying to discriminate against certain producers or attempting to influence competition in favor of other producers. The classification committees were not proposing the rule changes because of any perceived increase in box failures or claims but rather to include edge crush as an alternate criterion.

API proposed that the edge crush values be evaluated through a national survey of the current distribution of edge crush values for each basis weight of linerboard, based on actual U.S. box production. This survey was conducted in 1989 and 1990, and the results were analyzed by an independent statistician at New York Univ.

A new set of edge crush values were proposed by API, FBA, and AICC at the "minus 2 sigma" point on the normal curve of edge crush values found in the survey. This means that about 97% of all current U.S. box production could be expected to pass the edge crush requirements in the new schedule.

By July 1990, there was general agreement among the classification committees and the three trade associations as to what the new rules should contain. Table 1 shows the proposed table of "maximum size and weight —minimum fiberboard requirements" as it appeared in a preliminary draft of the proposed new rules being considered by the committees as of September 1990. The values shown are preliminary and subject to change before the proposal is included on the classification committees' docket for final consideration.

NEW QUESTIONS. The Institute of Packaging Professionals (IOPP), invited in mid-1990 to join the group of sponsoring organizations as the representative of box users, has raised some new questions about the paper industry edge crush values and test procedures.

These questions concern the adequacy of the edge crush values in the paper industry proposal for rule

changes. IOPP also questions the proposed test procedure and some other matters relating to the proposed new rules.

IOPP's questions may be resolved prior to docketing the new proposal for consideration by the classification committees. If not, it is possible that IOPP may docket its own proposal for rule changes to the committees, in competition with that of FBA/AICC.

REACTION OF BOX MAKERS. The International Corrugated Packaging Foundation (ICPF) held a symposium in Chicago, Ill., in August 1990 on various subjects of interest to box makers. Among the papers presented was one on the proposed changes in the shipping regulations for corrugated boxes. The comments and questions brought up at that meeting are probably representative of the concerns that U.S. box makers currently have.

Concerns expressed at that meeting fall into several categories, including quality and testing, operational, and marketing. One independent sheet plant owner asked if he would now have to spend $100,000 to equip his plant with a new testing laboratory to make sure that "... board run through here complies."

Independent box producers were acutely aware that a change to edge crush specifications brings with it a significant shift in the responsibility for compliance from

TABLE 1: **Boxes must comply with the burst or puncture test and other requirements of Part A, or, alternatively, must comply with the edge crush and other requirements of Part B.**

PART A

Maximum weight of box and contents (lb)	Maximum outside dimensions (length, width, and depth added) (in.)	Minimum bursting test, single-wall double-wall or solid fiberboard (psi)	Minimum combined weight of facings, including center facing(s) of double-wall and triple-wall board (lb/1,000 ft²)
		Minimum puncture test triple-wall board (in. oz/ in. of tear)	Minimum combined weight of plies, solid fiberboard, excluding adhesives (lb/1,000 ft²)
Single-wall corrugated fiberboard box			
20	40	125	52
35	50	150	66
50	60	175	75
65	75	200	84
80	85	250	111
95	95	275	138
120	105	350	180
Double-wall corrugated fiberboard box			
80	85	200	92
100	95	275	110
120	105	350	126
140	110	400	180
160	115	500	222
180	120	600	270
Triple-wall corrugated fiberboard box			
240	110	700	168
260	115	900	222
280	120	1,100	264
300	125	1,300	360
Triple-wall corrugated fiberboard box			
20	40	125	114
40	60	175	149
65	75	200	190
90	90	275	237
120	100	350	283

PART B

Minimum Edge Crush Test (ECT) (lb/in. width)	Maximum weight of box and contents (lb)	Maximum outside dimensions, length, width, and depth added (in.)
Single-wall corrugated fiberboard boxes		
23	20	40
26	35	50
28	50	60
30	65	75
36	80	85
43	95	95
52	120	105
Double-wall corrugated fiberboard boxes		
40	80	85
45	100	95
48	120	105
61	140	110
71	160	115
82	180	120
Triple-wall corrugated fiberboard boxes		
67	240	110
80	260	115
90	280	120
112	300	125

Note: As this issue went to press, the Freight Classification Committee adopted different proposed regulations than those shown in part B.

The above values have been docketed by the rail and truck classification committees but are preliminary and subject to change. A second, competitive proposal has been submitted by the Institute of Packaging Professionals and the American Society of Testing Materials.

the linerboard supplier to the box maker. The box plant can do relatively little in the conversion process to diminish bursting strength of a sheet, but good edge crush results depend heavily upon good technique and good equipment in combining, printing, and finishing the combined board.

Apprehension was expressed as to what information about rolls of high-ring-crush linerboard would be provided to the converters by linerboard suppliers and how this information could be used to ensure compliance with the new shipping rules. More than one test for ring crush is in use among U.S. producers of linerboard, and there was uncertainty about how ring crush test results for the roll stock should be used to predict edge crush for the combined board or top-to-bottom compression strength of the finished box.

It was pointed out that the new edge crush rule was offered as an alternative to the mullen/basis weight rule and that the existing rule would remain in effect for the time being. Some skepticism was expressed as to how long the mullen rule would remain in the regulations once the edge crush alternative was available.

The operational problems with an edge crush compliance requirement included the obvious problem of more care needed in combining, printing, and finishing in order not to destroy the potential edge crush performance built into the raw materials purchased by the converter.

Means of identification of edge crush and mullen rolls in the box plant inventory was a concern of some, as was the problem of identifying edge crush sheets in a sheet plant.

The question of what certificate to print on boxes now (before the new rule goes into effect) was answered by one box plant operator, who reported that he used a stamp on his edge crush orders that said, "This box is made from materials that have the top-to-bottom compression values of a 200-lb test container." The necessity for trimming the paper machine for high-performance linerboard orders as the new grades are phased into a box plant's business was a concern.

There seemed to be a trend toward use of single sources of supply for containerboard and the formation of "partnerships" between mill and box plant. Similar relationships were described between box makers and customers who desired custom board combinations for their containers.

Initial fears among the independent converters about availability of high-performance materials have largely been put to rest. Since the early 1980s, when AICC was an adversary to the proposed rule change, most of the mills producing HPC have decided to make their sheets available to converters outside their own company.

Marketing considerations discussed at the symposium included the need for sales training about the new rules and new materials and the question of whether to offer the high-performance sheets as a means of improving stacking strength or as a means for box customers to reduce their cost of packaging.

The independent corrugator operators differed as to how aggressively to promote edge crush containers. One operator reported having converted 100% to HPC raw materials and having improved his margins with the savings that the improved yield provided. Local competition forced another to pass on to customers all of the yield savings from his HPC orders, and then some.

Comments about the rule changes ranged from "fabulous opportunity for independents" to "single most difficult issue of the decade."

ISSUES FOR CONTAINERBOARD PRODUCERS. The new regulations are expected to be approved in early 1991. Following the formal approval, the impact on containerboard producers will depend on several factors, including the degree to which box makers and box users become aware of the significance of the change, the degree to which box users have already circumvented the existing rules through the use of special permits, exemptions and materials, and the degree to which the containerboard and box industries promote the use of HPC materials and packages to their customers.

The ability to produce high-ring-crush containerboard profitably varies widely among individual companies and mills in the containerboard industry. Some companies have aggressively promoted HPC for 15 years, while others remain on the sidelines. Those companies equipped with multi-ply linerboard machines and high-intensity presses have the option of using that capacity to make conventional board at reduced operating and raw material cost or to produce HPC materials. As long as the HPC market remains a premium-priced specialty niche, most of these companies will likely produce HPC to the extent that the market demands it and enjoy a lower cost on the balance of its production.

At least one major producer of linerboard has chosen to convert its entire linerboard system, except for the lightest weights, to the production of a grade of linerboard that has at least 2 lb of ring crush for each pound of basis weight, the generally accepted definition of high-performance linerboard.

There is reason to expect an increase in the importance of corrugating medium in the industry relative to linerboard as box users become more aware of the economics and engineering of compression strength in corrugated boxes. Basis weights, now standardized, will proliferate as differences among the mills in their ability to make high-ring-crush board become apparent.

Some slowing in the tonnage growth of the containerboard industry may be expected as box users eliminate overpackaging caused by old regulations. The situation is analogous to a period in the 1980s when the development of new polyethylene resins allowed progressively lower gauges for all types of plastic film applications. Film growth continued, while resin growth slowed.

The containerboard industry is very likely to experience a shift in grade mix, basis weight mix, and total volume as a result of the change in the rules. The extent

and timing of these effects remain to be seen. Some factors would seem to indicate an early and significant change in the containerboard business. Currently, HPC is probably the fastest growing segment of the containerboard business. Whether because of the existing regulations or other reasons, it is believed that overpackaging exists in as much as half of all corrugated boxes in use in this country.

Box plants, while apprehensive about the mechanics of making and selling high-ring-crush orders, have an opportunity to increase margins for orders switched to the new materials, as they do for any specification change. Box users who have not already switched specifications to take advantage of the new HPC materials can reduce their packaging cost, or increase the performance of their packages, or possibly both.

Other factors indicate that the ripple in containerboard volume and grade mix caused specifically by the rule change may not be noticeable. Many of the larger and more sophisticated box users have already changed box designs and materials to circumvent the existing rules or are using transportation modes not subject to the rules.

HPC grades still account for only a small fraction of total linerboard, and the introduction of new concepts and materials takes time in any industry, especially in a mature industry such as the corrugated box industry. The level of awareness about the upcoming changes among the smaller box users is probably not high at this time. The smaller box users typically default to the shipping regulations rather than investing time and money into developing their own specs, and it is this group that probably accounts for the bulk of whatever overpackaging exists.

CONCLUSION. Paper industry associations seem confident that the proposed rule changes will become a reality shortly after the first of 1991. Whatever differences remain about edge crush specs seem likely to be worked out very soon, if not worked out already. The regulation change will accelerate the already rapid growth of HPC.

HPC, as currently defined, will become another commodity grade, and its specialty status will move to those newer grades of "super HPC" that offer less variability in specs, better print surface, and better runability, in addition to improved ring crush. Linerboard mills will be differentiated by their ability to make good ring-crush board at low basis weights. As one box maker put it, "The [containerboard supplier] who comes in with fewer pounds of paper, and just talks about compression, is going to win the race." ■

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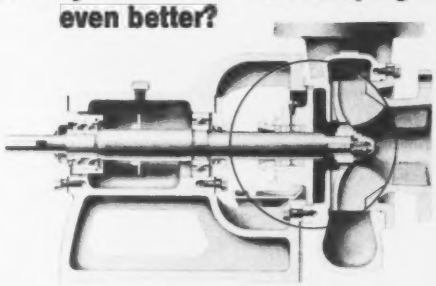

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